

## STUDIES IN THE GENUS DALEA

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*Dalea* is an American genus of the Papilionaceae, whose center of distribution appears to be in the Sierra Madre Occidental of Mexico. *Dalea* Juss. was conserved over *Parosela* Cav. by the International Botanical Congress of 1935. Herbarium folders of *Dalea* have been greatly enriched by recent collections, and certain sections of the genus have recently been studied by Wiggins (1940) and Clausen (1946a and 1946b). But the latest comprehensive treatment of the group is that of Rydberg (1920), listing 178 species for North America. This is an excellent treatment although, in the interest of binomial nomenclature, he delimited species very narrowly.

During the past ten or twelve years, *Dalea* has been of increasing interest to me in the field. Current studies in plant geography and the preparation of forthcoming floras now make it desirable to publish some new names and some judgments. It is merely an accident that most of the species here treated belong in Rydberg's section *Versicolores*, for I do not propose to revise the section at this time. Its southern representatives, including the type species, *D. versicolor*, are still imperfectly known; and its relationship to other sections of the genus needs re-evaluation.

The genus is strikingly rich in characters which may be used for taxonomic evaluation. By way of appraisal I once listed 150 morphological differences as expressed by the variants of the genus. As our collections of these variants increase, the limits of populations and species will become more surely apparent. There is much endemism and as our knowledge of Tertiary land forms grows, their distributions may be areally explained. Almost no cytogenetic work appears to have been done. The annual, *Dalea alopecuroides*, and the perennial, *D. occidentalis*, are known to have a diploid number of 14 chromosomes (Atchison, 1949). Obvious active speciation of this genus so wonderfully expressed in abundant characters recommends it highly for intensive taxonomic, genetic and evolutionary studies.

Loans of specimens from the University of Arizona, the Gray Herbarium, and the Dudley Herbarium have greatly facilitated the current studies. To the respective curators, Kittie Parker, Reed Rollins, Ira Wiggins and Roxana Ferris, the author expresses his keen appreciation for that cooperative spirit which has freely circulated the American materials of science. In citation of specimens, the institutional abbreviations are those proposed by Lanjouw (1939).

The following key introduces and orients a number of new

entities, referable to *Dalea*, section *Versicolores*, from the Sierra Madre region of northern Mexico and adjacent New Mexico and Arizona.

- Bracts and calyx lobes with tentacular glands on backs and margins; bracts persistent, conspicuously shorter than the calyx; leaflets without a distinctive mid-vein below; plants glabrous below inflorescence or only sparsely pubescent on upper side of leaflets ..... *D. tentaculoides*
- Bracts and calyx lobes without protruding glands on backs, but usually with a pair of marginal spur-like glands on calyx lobes; bracts early deciduous (except in *D. pinetorum*), two-thirds as long to longer than calyx; leaflets with a distinct mid-vein below; plants pubescent below the inflorescence (*D. Wislizeni calcarata* excepted).
- Wing petals and usually keel petals without apical glands; calyx weakly ribbed, without glands or with indistinct glands between the ribs; heads densely flowered, the flowers sessile.
- Stems with tufts of depauperate leaves near the base; stipules several times longer than the petioles; banner blade orbicular; wing petals nearly equaling keel petals in length ..... *D. pinetorum*
- Stems without tufts of depauperate leaves near the base; stipules shorter than the petioles; banner blade cordate to deltoid, longer than wide; wing petals shorter than keel petals.
- Heads large, 3-6 cm. long, 15-20 mm. wide (without corollas); leaflets up to 15 to 20 pairs, sparsely pubescent; virgate, mainly monopodial perennials ..... *D. surotatensis*
- Heads small, less than 2.5 cm. long and 15 mm. broad; leaflets up to 5 pairs, densely pubescent; prostrate to decumbent or diffusely branched polypodial perennials.
- Leaf rachis up to 10-20 mm. long, the petiole not more than twice as long as next segment; heads less than 10 mm. broad (without corollas), not subtended by a calyculus of ovate bracts; upper floral bracts 4-5 mm. long, broadly lanceolate; calyx 5-6 mm. long; keel (with claw) 5-7 mm. long; plants prostrate or decumbent with rooting runners ..... *D. Greggii*
- Leaf rachis less than 10 mm. long, the petiole 3 to 4 times as long as the next segment; heads 12-16 mm. broad, subtended by a calyculus of caducous ovate bracts; upper floral bracts 6-8 mm. long, linear lanceolate; calyx 6-8 mm. long; keel 7-10 mm. long; plants erect, to 6-8 dm. tall, without runners ..... *D. pulchra*
- Wing and keel petals with apical glands; calyx strongly ribbed, clearly glandular between the ribs (with calyx opened); heads not so densely flowered, the flowers short-pedicellate.
- Heads elongate (5 to 10 cm.); leaf rachis grooved above; lower calyx lobe twice as long as calyx tube; flowers pale lavender to nearly white ..... *D. leucantha*
- Heads not elongate or but little so (2-4 cm.); leaf rachis not distinctly grooved above; lower calyx lobe less than twice as long as calyx tube; flowers lavender to rose or purplish ..... *D. Wislizeni*

*Dalea pulchra* sp. nov. *D. Greggii* of authors, not *D. Greggii* A. Gray. Plate 14.

Suffrutex 5-8 dm. altus, ramis brunne-griseis vel pallide griseis; ramulis adscendentibus, tuberculatis, pubescentibus; foliis remotis, parvis, 6-10 mm. longis, sericeis; petiolo 1-5 mm. longo; foliolis 3-9, obovatis, rotundatis, conduplicatis, 2-5 mm. longis, 1.5-2 mm. latis, subtus glanduloso-punctatis; inflorescentiis pedunculatis, capitatis, confertifloris; calyce sessili pubescente, 6-8 mm. longo, lobis quam calycis tubus longioribus, plumosis, prope basin lateraliter calcaratis; vexillo toto vel partium albo luteove; petalis caeteris roseis.

Erect, diffusely spreading, polypodial, suffrutescent herb 5-8 dm. tall with abundant showy flowers. Stems dull brownish gray; branchlets ascending, yellowish gray to reddish brown, striate, tuberculate, sericeous to glaucous-glabrate, multibracteate at the base; stipules brownish, subulate, pubescent, 1-2 mm. long, geminate, united at base; leaves few, mostly remote, densely silvery pubescent; rachis 4-10 mm. long, grooved above; petiole 2-4 mm. long, more than twice the length of other rachis segments; stipules glandular; leaflets 3-9, obovate, petiolulate, conduplicate, rounded at apex, glandular punctate below, 2-5 mm. long, 1.5-2 mm. wide, thickish; inflorescence pedunculate, mainly terminal, the heads globose, 12-16 mm. broad (without corollas), subtended by an involucre of caducous, ovate, chartaceous, densely pilose bracts; upper floral bracts linear-lanceolate, 5-8 mm. long, densely long white pubescent on backs; calyx narrowly campanulate, long-pubescent, 10-ribbed; tube glandless or nearly so, notched deeply by the banner, ca. 3 mm. long, lobes subulate, unequal, the shorter 2-3 mm. long, the longer 3-5 mm. long, spurred laterally near the base; banner pale lavender to yellow, glandless, 6-8 mm. long, the blade deltoid-cordate, shorter than the claw; other petals rose, well exerted, the keel petals 7-10 mm. long, the blade rhomboid-ovate, longer than the claw; fruit depressed subquadrate, greatly narrowed and hyaline towards the base, crested, herbaceous, pubescent, and glandular dotted distally, ca. 3 mm. long; seed single, flattened, smooth, brownish, beaked above the hilum.

Type. Soldiers Trail Canyon, near Mount Lemmon road, southern slopes of the Santa Catalina Mountains, Pima County, Arizona, about 4500 feet elevation, April 15, 1946, *F. W. Gould* and *G. T. Robbins 3534* (ARIZ., no. 40197).

This attractive Arizona plant has long been identified with *Dalea Greggii* of northern Mexico. Observation and collection of *D. Greggii* in the north Mexican highlands and near the type locality by the author in 1942-43, brought the realization that two distinct populations had long been considered as one. A study of materials brought together, including the type of *Dalea*

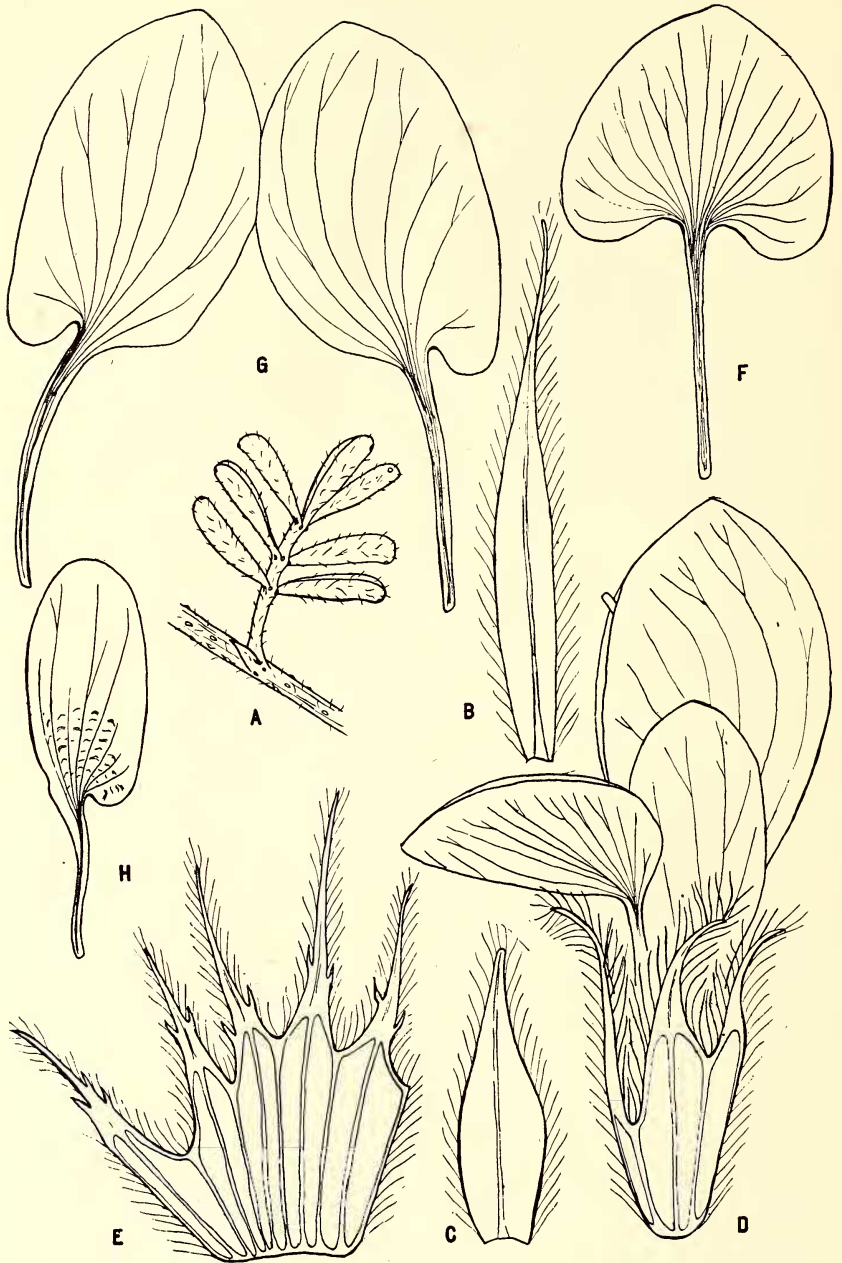


PLATE 14. *DALEA PULCHRA*. Fig. A, leaf,  $\times 10$ . Figs. B and C, upper and lower floral bracts,  $\times 20$ . Fig. D, flower,  $\times 20$ . Fig. E, calyx spread open,  $\times 20$ . Figs. F, G, H, banner, keel and wing petals,  $\times 20$ . Drawn from the type.



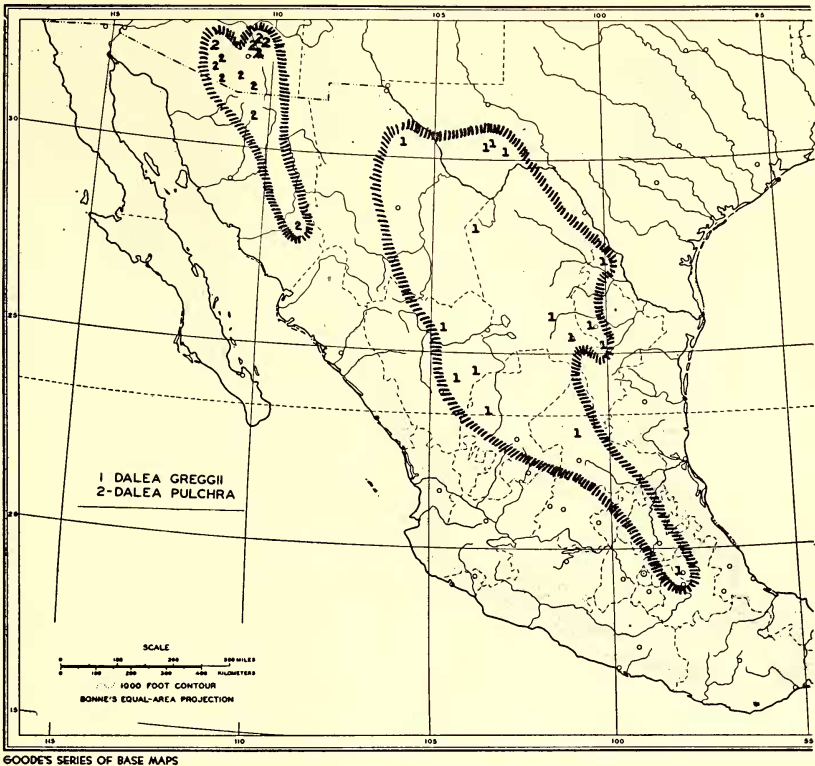


FIG. 1. Distribution of *Dalea Greggii* and *D. pulchra*.

*Greggii*; leaves no doubt in the author's mind but that we are dealing with two distinct species occupying separate areas (fig. 1 and pls. 14 and 15). They are both grama grassland species. *Dalea Greggii* grows upon the piedmonts of the Sierra Madre around the borders of the Chihuahuan and Hidalgan deserts from Texas to Puebla while *D. pulchra* is more restricted to the oak woodland and grassland bajadas of southeastern Arizona, bordering the Sonoran Desert as far south as southern Sonora through the western foothills of the Sierra Madre Occidental.

*Dalea pulchra* and *D. Greggii* have similar calyces and both have drought-inhibited, ovate, conduplicate, densely sericeous leaflets. The morphological similarity apparently has led modern taxonomists to follow Gray and later Rydberg in assigning the Arizona plant to Gray's *D. Greggii*. However, those two men were working with very limited collections and neither knew the plants in the field. Although there has been considerable collecting in both areas of the species during the last twenty years, collections of these two species are still not abundant, viz.:

Gray Herbarium, *D. Greggii*, 15 sheets, *D. pulchra*, 8 sheets; University of Arizona Herbarium, *D. Greggii*, 3 sheets, *D. pulchra*, 14 sheets.

The erect, bushy *D. pulchra* with relatively large heads and showy flowers contrasts strongly in appearance with the low decumbent to prostrate *D. Greggii* with small heads and inconspicuous flowers. These two species, with *D. surotatensis*, form a tight complex of the section *Versicolores*, characterized by compact heads, sessile calyces with weak ribbing and nearly glandless tubes.

DALEA GREGGII A. Gray, Mem. Am. Acad. Ser. 2, 5: 314. 1854. Not *D. Greggii* of authors. Plate 15.

This is a small decumbent or prostrate perennial herb of gray aspect with small reddish lavender to purple flowers borne in small erect terminal pedunculate heads. It spreads vegetatively by rooted runners and in time forms rather tight clones one or more meters in diameter. Perhaps correlative to its vegetative reproduction, the lower flowers appear commonly to be sterile. This is in contrast to the fertile lower flowers of *D. pulchra*. Whereas in *D. pulchra* the floral bracts are dimorphic, in *D. Greggii* the upper and lowermost floral bracts have essentially the same form, although the lowermost bracts are usually somewhat smaller, as in other species of this section. The area known to be occupied by *D. Greggii* is shown in Fig. 1. Gregg's original collection in the Gray Herbarium is labelled "Near Buenavista [Coahuila, Mexico], March 27/47". It is mounted on a sheet with two specimens collected by Thurber in northern Mexico in 1852.

*Dalea leucantha* (Rydb.) comb. nov. *Parosela leucantha* Rydb., N. Am. Fl. 24: 103, 1920.

This low shrubby herb, 5 to 10 dm. tall was originally described from Nayarit and Jalisco, Tepic being the type locality. Although clearly related to *D. Wislizeni*, its elongate and relatively lax inflorescence, short calyx tube with long lobes, quadrate and grooved leaf rachis persisting on the stems, the generally sparser pubescence, and twiggy branching, warrant considering *D. leucantha* as specifically distinct. The type specimen (Palmer no. P in 1891-1892, G), represents a plant in advanced flowering condition, nearly leafless, but the rachis persists. Other than 1891-1892, the specimen carries no date, but it is obviously a winter collection. A recent collection extends the range well into Sinaloa: Gentry 5685, Sierra Tacuichamona summit, February 19, 1940; "Low-bending shrubby herb in grass under oaks. Flowers pale lavender." Rydberg described the flowers as white. The Sinaloa material is in leafy condition, but also exhibits persistent leaf rachis with fallen leaflets, a character carried to some extent by part of the *D. Wislizeni* complex. The calyx lobes are noticeably longer in the Sinaloa specimens.



PLATE 15. DALEA GREGGII. Fig. A, stem section with leaf,  $\times 10$ . Fig. B, floral bract,  $\times 20$ . Fig. C, calyx spread open,  $\times 20$ . Figs. D, E, F, banner, keel and wing petals,  $\times 20$ . Drawn from *Gentry 8554*.

*Dalea pinetorum* sp. nov. Herba perennis 2–4 dm. alta; caulibus ad basin rosulas densas foliorum parvorum ferentibus; stipulis 6–9 mm. longis, subulatis, pubescentibus, brunneis, persistentibus; petiolo 1–3 mm. longo; foliis 25–39, 5–8 mm. longis, ellipticis, acutis, pilosis, subtus granduloso-punctatis; bracteis lanceolatis; 7–9 mm. longis, pilosis, persistentibus; calyce sessili, 7–8 mm. longo, pubescente, lobis quam calycis tubus longioribus, plumosis, subulatis; vexillo rotundo, 4 mm. diametro. Plate 16.

Perennial herb, the 1 or 2 stems 2–4 dm. tall, densely tufted near the base with soft pilose depauperate leaves; stems erect, yellowish to reddish brown, striate, copiously white-pilose; stipules 6–9 mm. long, linear subulate, long pilose, brownish, persistent, commonly reflexed; leaves above the tufts 2.5–4 cm. long, the petioles 1–3 mm. long, white-pilose; rachis rounded, rufus, persisting after the fall of leaflets; stipels obscure conic glands adnate to the petiolules; leaflets 25–39, narrowly elliptic, mostly 5–8 mm. long, acute at each end, sparsely silvery pilose above and below, minutely gland-dotted below, the mid-vein prominent below to the apiculate tip; peduncles terminal, 2–6 cm. long, thickened below the head, pilose; heads densely flowered, 13–15 mm. thick (without corollas), up to 3–5 cm. long; bracts narrowly lanceolate, acuminate, 7–9 mm. long, persistent, pilose, the lowermost reflexed, somewhat longer than the upper; calyx 7–8 mm. long, the lower lobe somewhat longer, strongly 10-ribbed, glandular between the ribs, sessile, subtended by 1 or 2 yellowish, subulate glands ca. 1–2 mm. long; tube 2.8–3.0 mm. long, shallowly notched by the banner, long pilose about the rim and glabrate below; lobes 4.5–6 mm. long, subulate, long-pilose, with pale yellow lateral spurs; blade of the banner orbicular, 4 × 4 mm.; purplish, with an apical gland and a bent arc of glands across the middle; blades of the wings oblong, purple, 4.5–5 mm. long, about equaling the keel petals, the claw attached obliquely, glandless; blades of the keel petals oblong-ovate, ca. 5 mm. long, purple, glandless; stamens 10, long exerted, the column, equaling or exceeding the calyx lobes; ovary densely long-pilose; ovule 1.

Type. La Mesa Colorado in Sierra Madre of western Chihuahua, Mexico, "Pine-oak association, pine mesa," October 12, 1933, *Gentry 529* (DS, no. 257578; isotype ARIZ).

This distinct species has no close relative among the known species of *Dalea* of northern Mexico. The dense elongate heads, the elongate subtending flower glands, the strongly 10-ribbed calyces with plumose subulate lobes and the numerous elliptic

EXPLANATION OF THE FIGURES. PLATE 16

PLATE 16. DALEA PINETORUM. Fig. A, section of stem with leaf and stipules, ×5. Fig. B, detail of leaflets, ×8. Figs. C and D, dorsal and lateral sides of floral bracts, ×16. Fig. E, calyx spread open, ×16. Figs. F, G, H, I, banner, wing, keel petals, and staminal column, ×16. Drawn from type.



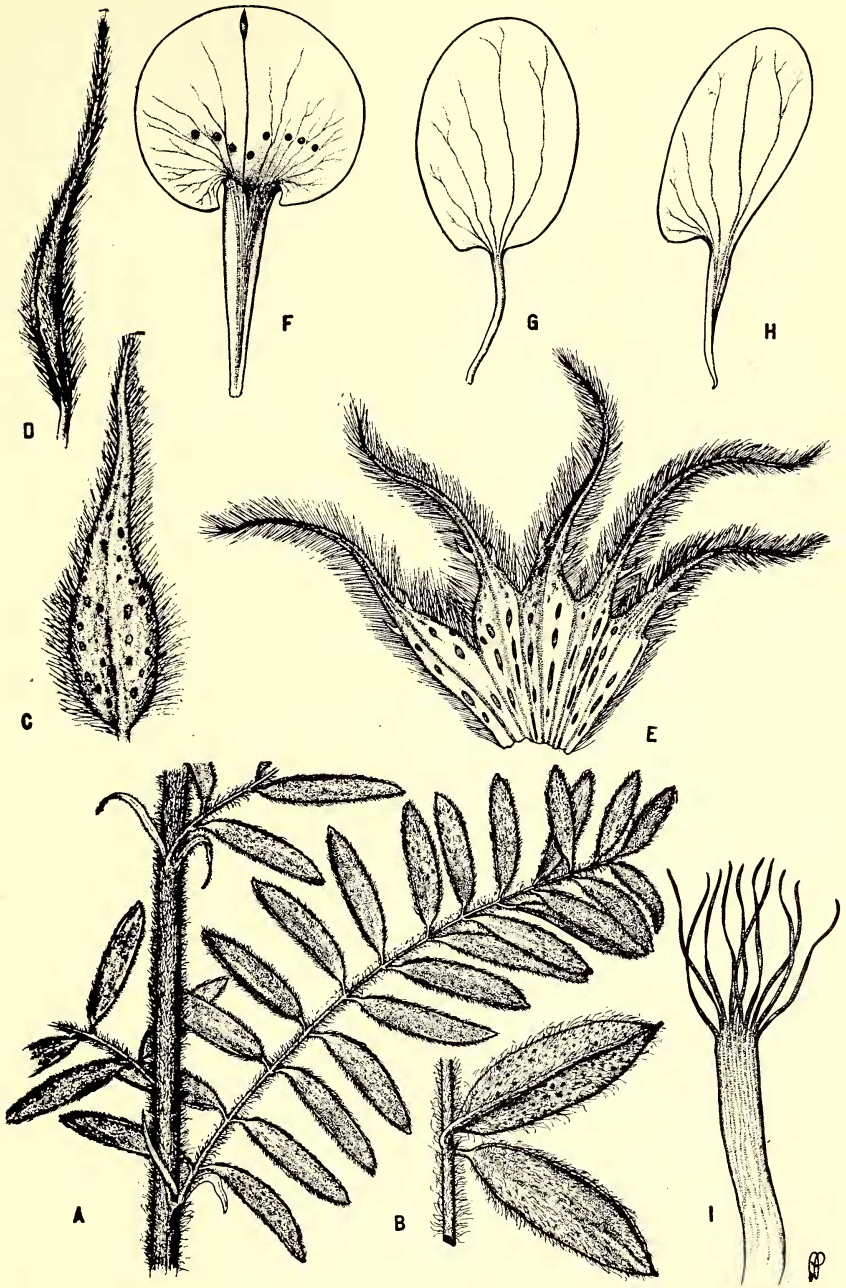


PLATE 16. DALEA PINETORUM.



leaflets with heavy mid-veins place it in Rydberg's section *Versicolores*. While the dense sessile flowers with glandless wings suggest relationship with the *pulchra-surotatensis* group, the elliptic, strongly veined leaflets separate it towards the *Wislizeni* complex. It is easily distinguished from all congeners by the peculiar tufts of basal leaves, the elongate stipules, and the glabrate calyx tube. The only other collection available is from the same area near the Chihuahua-Sonora boundary (*Gentry 653*, Sierra de las Papas, Chihuahua, October 22, 1933, DS.) These specimens were just beginning to head. Both localities are between 6000 and 7000 feet elevation and are dominated by pine.

*Dalea surotatensis* sp. nov. Suffrutex virgatus 5-15 dm. altus; ramis gracilibus; villosis, luteo- vel badio-brunneis; foliis 2-5 cm. longis, villosis; petiolis 4-6 mm. longis; foliolis 15-39 ellipticis usque ad obovatis, rotundatis, mucronatis, brevi-petiolulatis, subtus obscure glanduloso-punctatis, 5-7 mm. longis, 2-3 mm. latis; inflorescentiis longe pedunculatis ramos coronantibus; calyce sessile, dense longe villosa, eglandulosa, petalis pallide violaceis, vexillo minus saturato. Plate 17.

Slender virgate subshrub 5-15 dm. tall, mainly monopodial, with large cylindrical, long-pedunculate, showy heads; stems reddish brown, sparsely white-villose, striate, non-tuberculate; branchlets and peduncles paler and more densely pilose or villous; stipules brownish, pubescent, 2.5-3 mm. long, persistent; leaves mostly fascicled on short shoots, 2-5 cm. long, the rachis rounded, pilose; petioles 4-6 mm. long; stipels conic, minute, below the petiules; leaflets 15-39, oblong, mucronate, 5-7 mm. long, 2-3 mm. wide, sparsely silvery pilose on both sides, weakly and irregularly black punctulate below, mid-vein prominent basally, obscure apically; peduncles lateral and terminal, 3-10 cm. long; heads large, cylindrical, up to 5-6 cm. long, 15-18 mm. wide (without corollas), densely flowered; bracts scarcely persistent, 7-8 mm. long, equaling or exceeding calyces, linear-lanceolate, subulate, bent below and conduplicate, densely long silvery pilose, obscurely glandular; calyx narrowly campanulate, ca. 7 mm. long, weakly ribbed, eglandular or minutely glandular between the ribs, slightly notched by the banner; lobes subulate, 3.5-4.5 mm. long, longer than the tube, with minute lateral spur-glands, plumose; petals lavender, drying reddish, the banner paler, deltoid, 4.5 x 3.5 mm., with scattered glands near the middle; blades of the wings linear-oblong, 5.5-6 mm. long, 2 mm. wide

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EXPLANATION OF THE FIGURES. PLATE 17

PLATE 17. DALEA SUROTATENSIS. Fig. A, section of stem, leaves, and stipules, x5. Fig. B, detail of leaflets, x8. Fig. C, dorsal view of floral bract, x16. Fig. D, calyx spread open, x16. Figs. E, F, G, H, banner, keel, wing petals, and stamens, x16. Drawn from type and topotype (*Gentry 7180*).

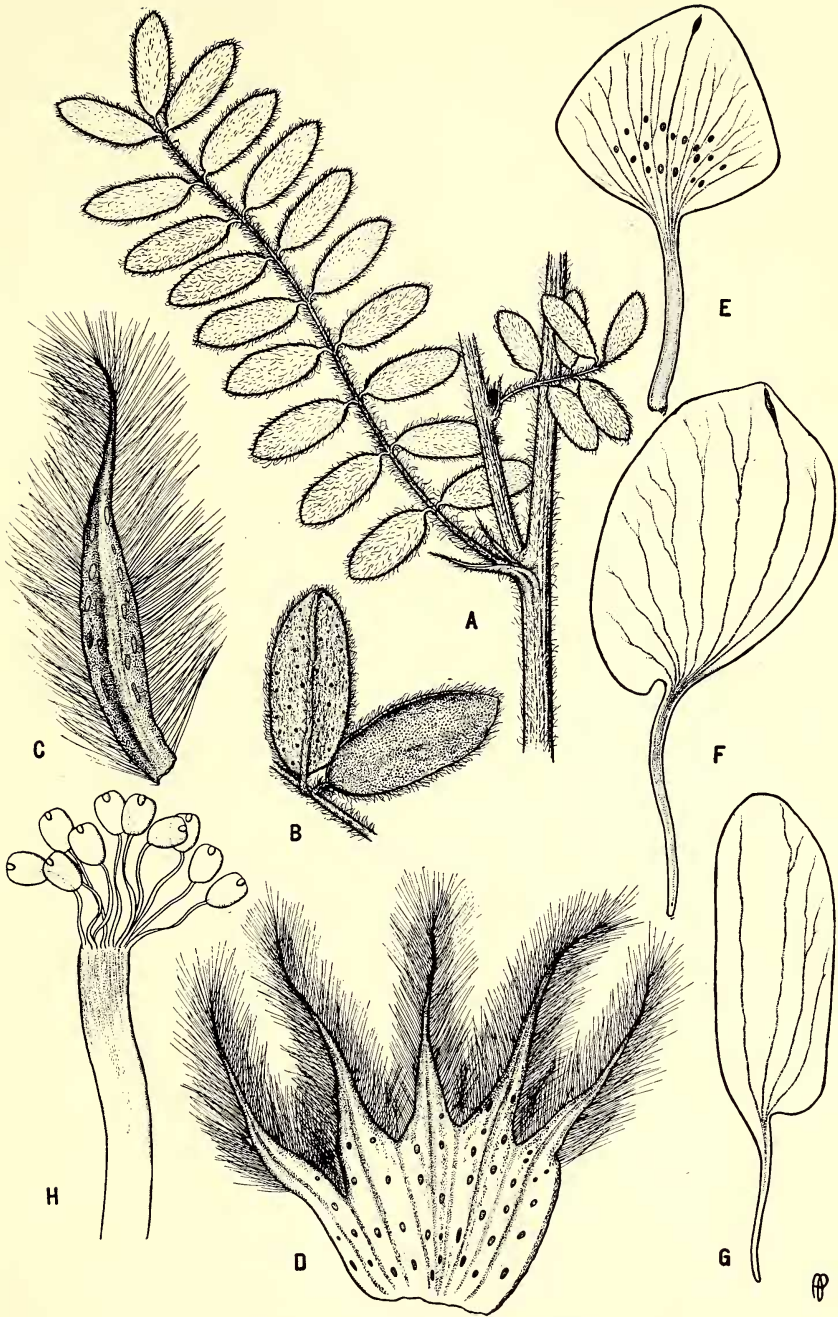


PLATE 17. DALEA SUROTATENSIS.

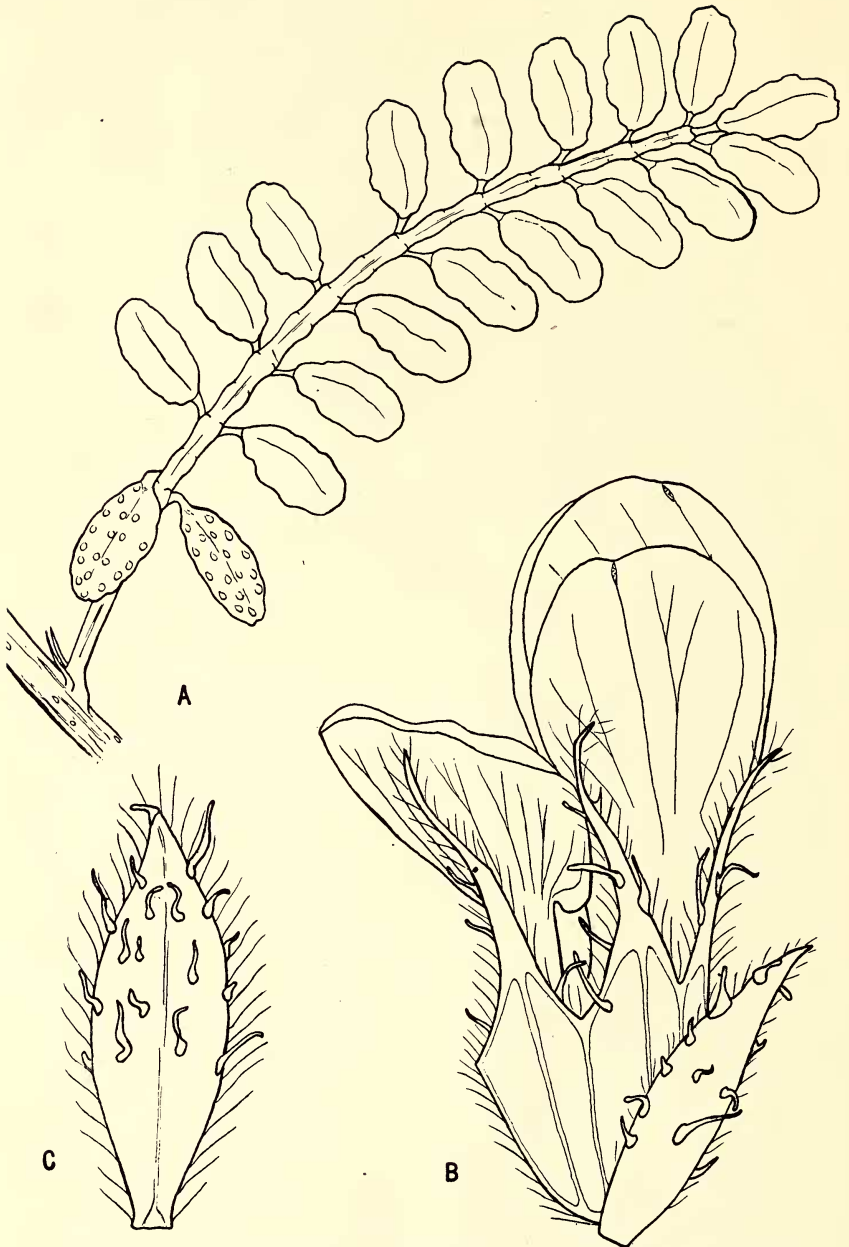


PLATE 18. *DALEA TENTACULOIDES*. Fig. A, stem section with leaf,  $\times 10$ . Fig. B, flower and bract,  $\times 20$ . Fig. C, floral bract,  $\times 20$ . Drawn from type.

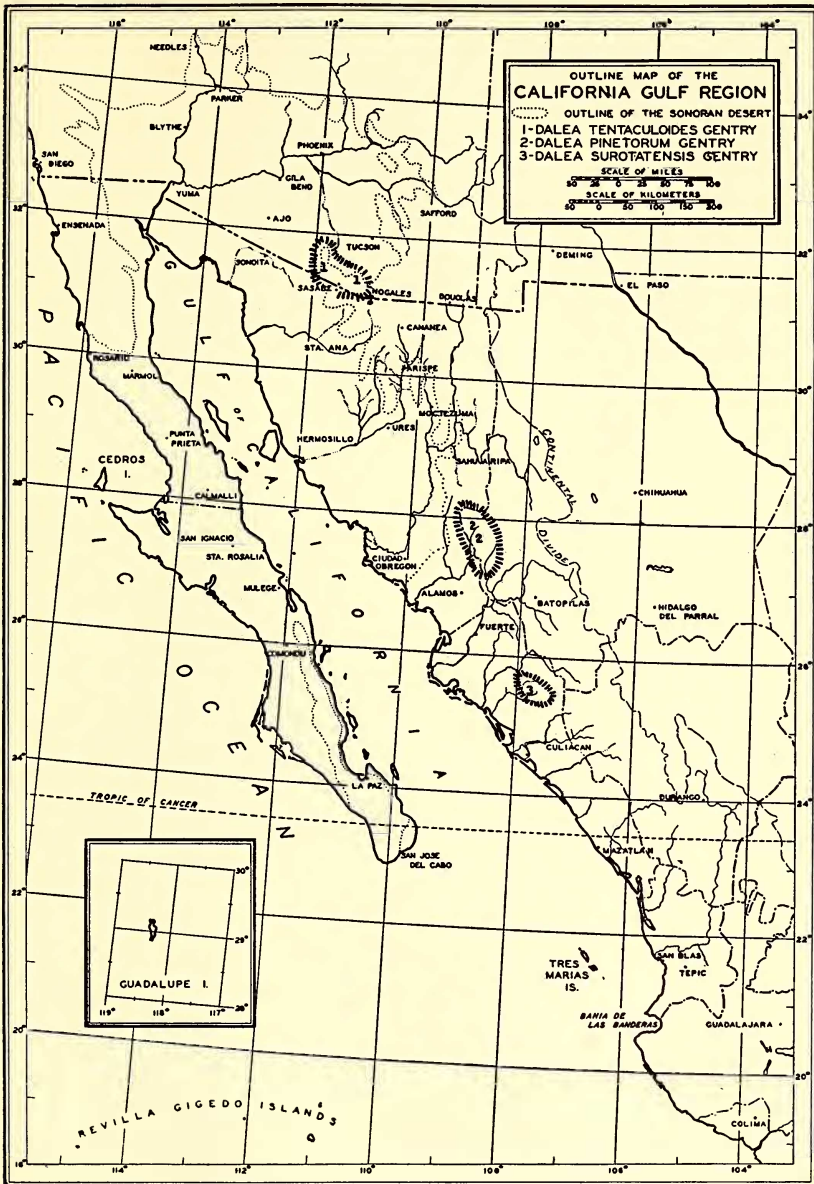


FIG. 2. Distribution of *Dalea tentaculoides*, *D. pinetorum*, and *D. surotatensis*.

without apical gland; blades of the keel obliquely ovate, 6–6.5 mm. long, 4 mm. wide rarely with apical gland; stamens 10, the



column exerted beyond sepal tips; ovary pubescent; ovules 2; pod triangular, densely long white-pilose and minutely glandular distally; seed 1, reniform, smooth, yellowish brown.

Type. Above La Jolla, Sierra Surotato, Sinaloa, Mexico, on the open slopes in pine-oak forest, 5000–6000 feet, March 17–24, 1945, *Gentry 7291a* (DS; isotypes, US, A, NY, F, PH, MICH, Hancock Foundation, Gentry Herb.; topotypes, *Gentry 7291, 7180*, “Flowers lavender; 5–15 dm. high”).

The long-pedunculate, large-headed inflorescences suggest *D. sericea* of section *Sericeae*, which is closely related to the section *Versicolores*, but the thin leaf, the woody branches, and lateral heads place it in *Versicolores*. Its nearest relative appears to be *D. pulchra*, from which it is amply distinct in its non-tuberculate stems, its larger, thinner less pubescent and more numerous leaflets, its homomorphic rather than dimorphic bracts, the monopodial virgate habit, the large heads, etc.

*Dalea tentaculoides* sp. nov. Herba perennis multicaulis 3–5 dm. alta, caulibus glabris viridibus; stipulis 1–2.5 mm. longis subulatis pallidis; foliolis 15–27, glabris vel glabratis, oblongis vel obovatis rotundatis undulatis vel integris, 2.5–5 mm. longis, 1.5–2.5 mm. latis, subtus glanduloso-punctatis; bracteis glanduloso-corniculosis, pilosis, 4–5 mm. longis, lanceolatis; calyce sessili, pubescente 5.5–7 mm. longo, lobis quam calycis tubus longioribus, lanceolatis, pilosis glanduloso-corniculosis; petalis purpureis, vexillo minus saturato. Plates 18, 19.

Erect polypodial herb perennial from a woody thickened root crown, essentially glabrous below the inflorescence, the bracts and calyx lobes with prominent tentacle-like glands; stems green to stramineous, pustulate-tubercled, lowly ribbed, 3–5 dm. tall, glabrous, branching from near the base; stipules 1–2.5 mm. long, subulate from a narrow base, deciduous, nearly white or somewhat colored; leaves apparently ephemeral, 2–3.5 cm. long, the rachis glabrous, rounded below, flattened or grooved above, thickish, glandular; petioles 2–4 mm. long; leaflets 15–27, oblong to obovate, rounded apically, rounded to obtuse basally, the margins undulate or entire, 2.5–5 mm. long, 1.5–2.5 mm. wide, sparsely pubescent to glabrate above, glabrous and coarsely or finely glandular dotted below; peduncles 1–4 cm. long, terminal and lateral; heads 1–2 cm. long, triangular to oblong; bracts broadly lanceolate, short acuminate, 4–5 mm. long, much shorter than calyx, sparsely pilose, with conspicuous tentacle-like, apiculate, and often bulbous-based glands on the backs; calyx sessile, subtended by small, subulate, hyaline glands, campanulate, 5.5–7 mm. long, eglandular between the weak ribs; sparsely pilose, lobes lanceolate, apiculate with a gland, 3.5–4 mm. long, elongate glands up to 1 mm. long, along and near the margins; banner 4 × 3.5 mm., ovate, retuse, “violet”, with an apical gland and smaller



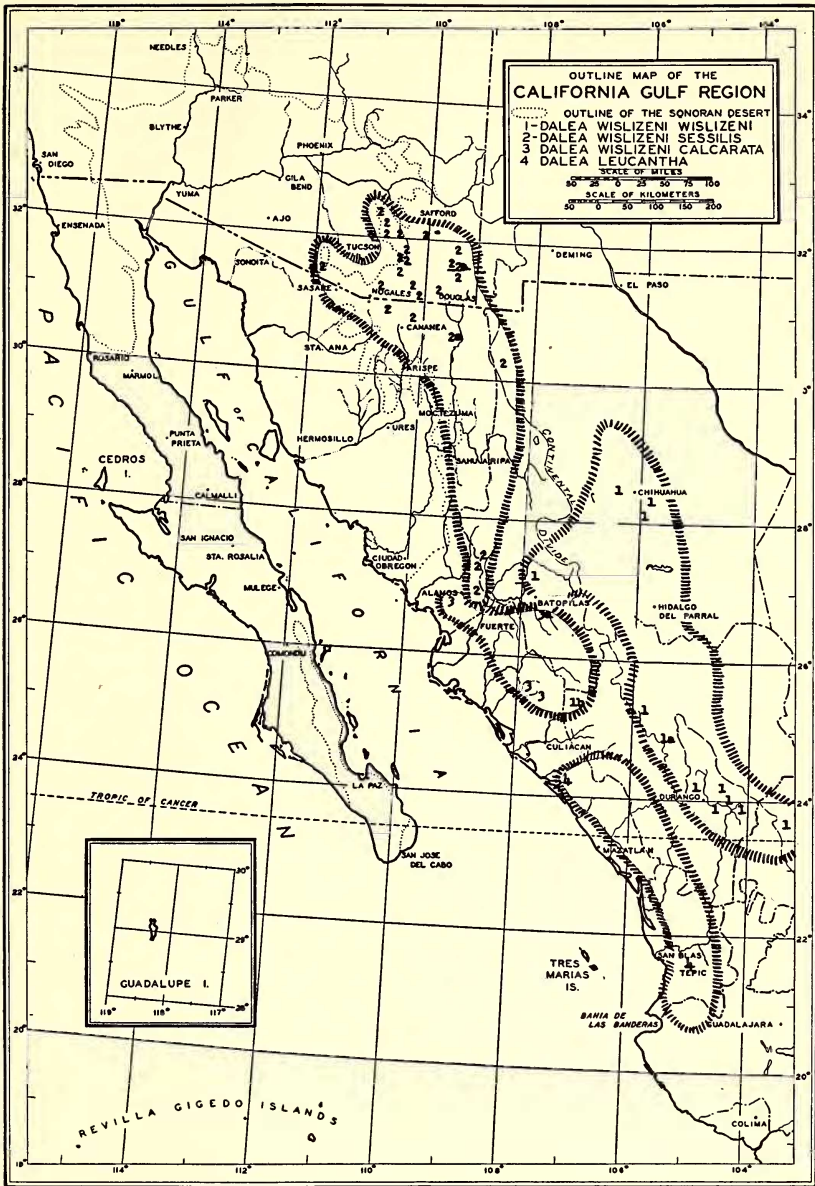


FIG. 3. Distribution of *Dalea Wislizeni* and *D. leucantha*.

scattered glands near the middle; wing blades oblong, ca. 5 mm. long, purple, with a narrow sinus below, a small gland apically; keel blades obliquely ovate, 5.5 mm. long, purple, with a gland

near apex; stamens 10, the column not exerted beyond sepal tips; ovary pubescent, sparsely gland-dotted; ovules 2, one aborting.

Type. Sycamore Canyon, between Nogales and Ruby, Arizona, May 9, 1941, *Darrow s. n.* (ARIZ, no. 30239). Additional specimens examined are from the Baboquivari Mountains of southern Arizona: *Gentry 3386*, summer of 1937; *Gentry 3407*, west slope of Baboquivari Mountains, October, 1937, "rocky volcanic slopes 3000-4500 feet;" *Goodding 393 G*, April 17, 1935.

I am unable to associate this plant with a close relative and assign it tentatively to the *Versicolores* section, where it is somewhat out of character in having herbaceous shoots with glabrous and ephemeral leaves. In the apical glands and other characters, however, it appears to belong to the *Versicolores*. The striking specific character of the elongate tentacle-like glands on the bracts and calyx lobes, while unique, does not of itself alienate it from other members of *Versicolores*. Similar glands rarely occur near the base of bracts of *D. Wislizeni calcarata*. As with many other species of *Dalea* it is bifloral in that it may flower in both the spring and fall season following the winter and summer rainfalls. As with *D. Wislizeni sessilis*, the heads which develop in the fall are often much reduced in comparison with those produced in the spring and many contain only three, four or five flowers, as though the progressively lower temperatures and shorter days were definite inhibiting conditions. This species appears to be a montane-insular endemic, originating in isolation upon either the Baboquivari or the Sierritas mountains with subsequent migration to the other. Probably it originated on the Sierritas which appear to be older, judging from the extent of their leveling. It is remarkable that a plant so close to the botanic centers of the University of Arizona and the Carnegie Desert Laboratory was so long uncollected and unrecognized.

*DALEA WISLIZENI* subsp. *Wislizeni*. *Dalea Wislizeni* Gray, Mem. Am. Acad. Ser. 2, 4: 32, 1849.

Suffrutex gracilis 8-12 dm. altus; ramis gracilibus, ferrugineus, albo-villosis; ramulis terminalibus, adscendentibus, caule simplici prope basin, ramoso in inflorescentia; foliolis 15-25, ellipticis, acutis, 3-7 mm. longis, 1-2 mm. latis, nervis prominentibus dense pubescentibus; inflorescentiis plerumque terminalibus, 2-4 cm. longis laxifloris; bracteis quam calyx longioribus, linearilanceolatis. Plate 20.

*Dalea Wislizeni* is typically a polypodial perennial with strong but virgate stems 8-12 dm. tall, clearly ferruginous and silvery pilose or villous, branched only in the terminal half or third to form a narrow flowering crown with terminal inflorescences. It is further characterized by the 15-25 elliptic, acute, villous leaflets with strong midvein below, the somewhat elongate rather lax

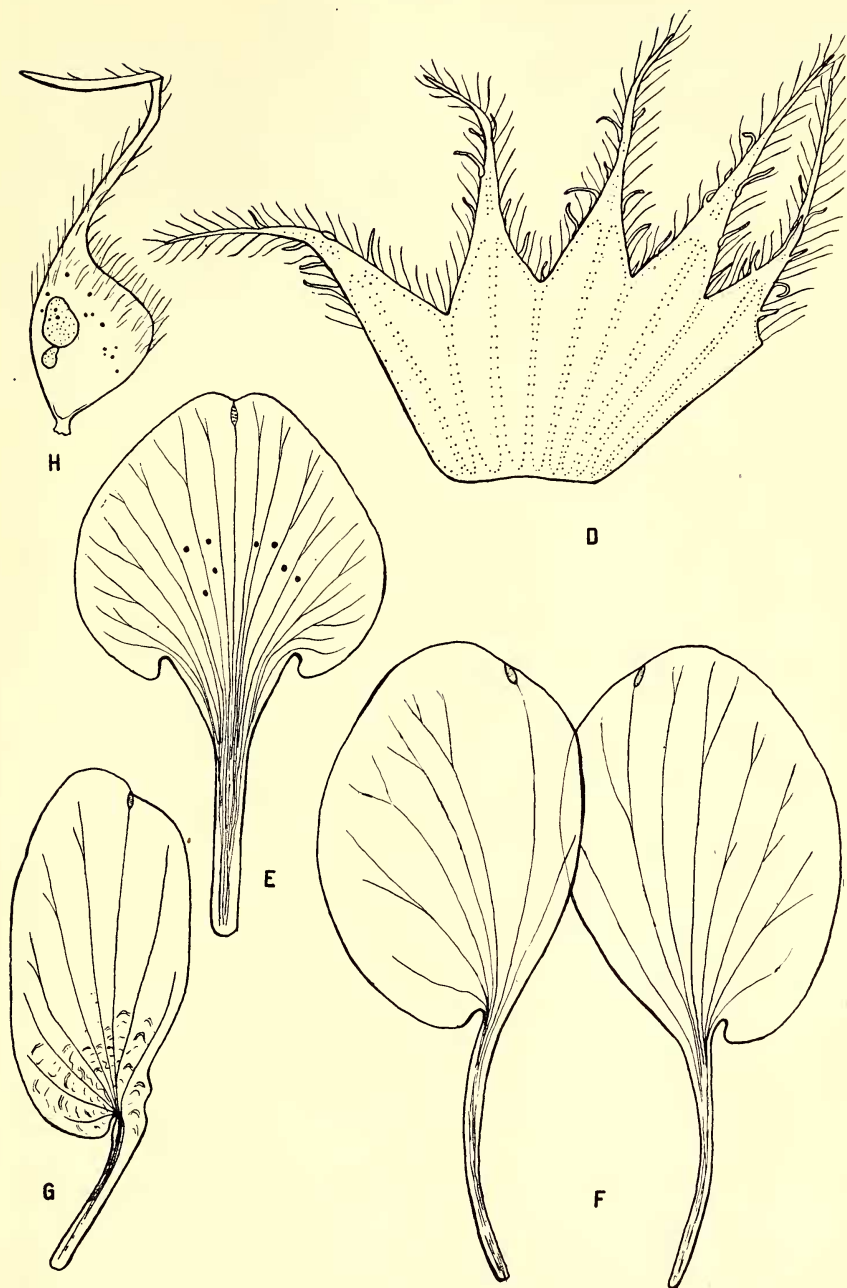


PLATE 19. DALEA TENTACULOIDES. Fig. D, calyx spread open,  $\times 20$ . Figs. E, F, G, banner, keel, and wing petals,  $\times 20$ . Fig. H, ovary,  $\times 20$ . Drawn from type.

spikes, and the linear-lanceolate bracts equaling or exceeding the calyx lobes. Other characters separating it from allied species are given in the foregoing key. More than in most other members of the section *Versicolores*, the specific complex as a whole exhibits considerable variation in branching habit, leaf form, pubescence, in the length, size and shape of floral parts, and in other parts. It is primarily of the oak woodland and grama grasslands on the middle mountain slopes and the eastern piedmont plateau of the Sierra Madre Occidental from southeastern Arizona south to northern Zacatecas and northern Sinaloa in Mexico (fig. 3). The type was reported by Gray as collected by Wislizenus in October of 1846 in the plains west of Ciudad Chihuahua, but the label of the type sheet reads "Mts. west of Chiricahui, Mex. Wislizenus". I have been unable to locate the latter name on maps.

*Dalea Wislizeni Wislizeni* is apparently to be omitted from the flora of the United States. The accompanying map (fig. 3) shows it to range from the latitude of Ciudad Chihuahua along the eastern piedmonts of the Sierra Madre as far as northern Zacatecas, where field observations showed it to be common in the grama grasslands formation on the rocky oak slopes as well as out upon the plains in the grama climax association. It was never found in abundance but was encountered widely scattered, its silvery gray, slender, and graceful form over-topping the shorter grasses. On the basis of the specimens studied, the distribution has been plotted on the accompanying map (fig. 3). Some variants of subspecies *Wislizeni* are notable as follows:

A collection from near Santiago Papasquiario in northern Durango (*Palmer 67 in 1896*) is extratypical and differs from all other segregates in the small vernicose calyx. It is a spring collection in advanced flowering state and shows the prolific lateral flowering that characterizes the spring form of *D. Wislizeni sessilis*. Perhaps it was this character which led Macbride to so annotate the collection in 1921. It is apparently worthy of a separate name, but I am reluctant to diagnose it with but the one sheet available for study. Another variant, appearing closest to subsp. *Wislizeni*, is represented by a specimen from San Ramon in extreme northwestern Durango (*Palmer 138 in 1906*). It also has the prolific lateral inflorescences of spring but has unusually broad leaflets and relatively sparse pubescence.

The following key separates the subspecies, as I understand them.

#### KEY TO SUBSPECIES OF DALEA WISLIZENI

Leaflets elliptic, acute, the mid-vein pronounced below and extending to tip of leaflet; stems virgate, but little branched below, densely villous or glabrous; leaflets mostly 15-35.

Plants villous below the inflorescence; calyx tube notched about half way to the base by the banner, not exceeding 3 mm. long

..... *D. Wislizeni Wislizeni*

- Plants essentially glabrous below inflorescence; calyx tube not notched or only slightly so, over 3 mm. long ..... *D. Wislizeni calcarata*
- Leaflets elliptic obovate, cuneate, rounded at the tip, the mid-vein relatively weak; stems short, much branched below, sparsely pubescent; leaflets mostly 11-17 ..... *D. Wislizeni sessilis*

**DALEA WISLIZENI** subsp. **calcarata** subsp. nov. Suffrutex gracilis 8-15 dm. altus; ramis gracilibus, rubro-brunneis vel pallide griseis; ramulis adscendentibus, levibus, subsulcatis; foliis remotis, 2-4 cm. longis, glabris, petiolo 1-5 mm. longo; foliolis 13-35, ellipticis, acutis, 3-5 mm. longis, 1-1.5 mm. latis, subtus glanduloso-punctatis; inflorescentiis per caulis dissitis terminalibusque, brevi-pedunculatis; calyce pubescente et inter costulas glanduloso-punctato, 7-9 mm. longo, lobis quam calycis tubus longioribus, plumosis, calcaribus 1-3 lateralibus glandulosis ad medium insignitis; vexillo toto vel partim albo luteove, ad basin glanduloso-punctato, petalis caeteris pallide violaceis roseatisve. Plates 21, 22.

Slender subshrub 8-15 dm. tall with graceful bending branches rather profuse in an open crown, essentially glabrous below the inflorescence; stipules 1.5-2 mm. long, brownish, subulate, persisting on old branches; leaves mostly 2-4 cm. long, glabrous, the rachis rounded; stipels dark conic apiculate glands; leaflets 13-35, elliptic, acute or obtuse, 3-5 mm. long, 1-1.5 mm. wide, petiolulate, the mid-vein prominent and exserted below in a glandular tip, gland-dotted below; heads terminal and lateral, short pedunculate, 1.5-3 cm. long; bracts linear-lanceolate, silvery pilose, with 1-3 glands, the lower shorter than the calyx, the upper equaling or exceeding the calyx; calyx short-pedicellate, silvery pilose, glandular between the ribs, 7-9 mm. long, green-brindled; tube 3-4 mm. long, not notched by the banner or but slightly so; lobes subulate, 4-5 mm. long, calcarate with a pair of subulate glands on the margins, rarely one in the sinus; stamens 9-10, the column exserted; banner deltoid, 5 x 4.5 mm., dotted with glands centrally below the middle; all petals with an apical gland; blades of the wings sharply oblong, 6-7 mm. long; blades of keel petals elliptic-ovate, 7-8 mm. long; ovary narrow, silvery-pilose above, with 1 large gland near the apex.

Type. Los Pucheros, Sierra Surotato, northern Sinaloa, Mexico, on openly forested slope with pine-oak-madroño, elevation 5500-6500 feet, March 24, 1945, *Gentry 7182* (DS; isotypes; MICH, A, NY, F, US, PH, Hancock Foundation). Other specimens assignable here are: topotype under the same date, *Gentry 7186*, Puerto a Tamiapa, Dist. Badiraguato, Sinaloa, March 5, 1940, *Gentry 5811*, "Open slopes with deep clay soil, Oak Forest, 4500 feet;" Sierra de Alamos, Sonora, March 26 to April 8, 1890, *Palmer 282*; north wall of Barranca de Cobre [Rio Urique], south-



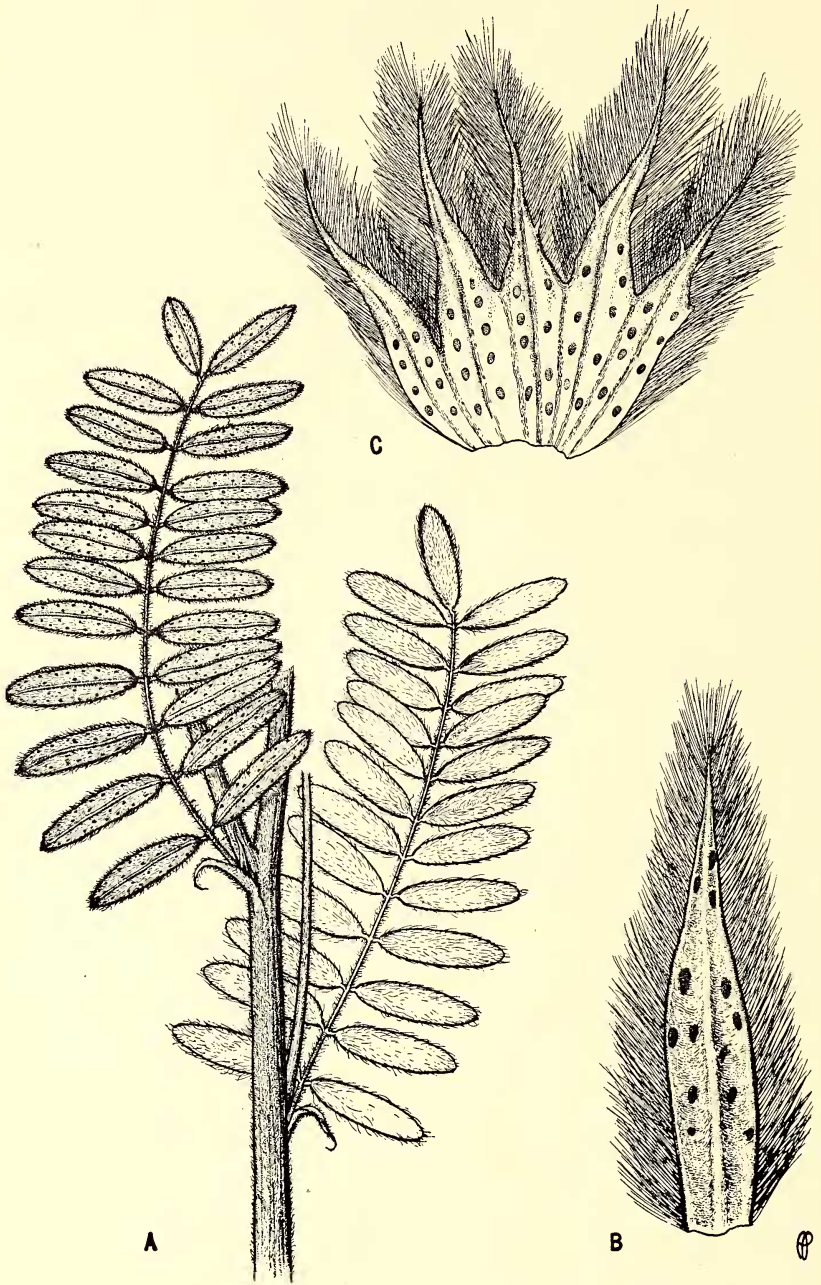


PLATE 20. DALEA WISLIZENI WISLIZENI. Fig. A, stem and leaves,  $\times 5$ . Fig. B, floral bract,  $\times 16$ . Fig. C, calyx spread open,  $\times 16$ . Drawn from *Palmer 574* in 1885 and *Gentry 8437a*.

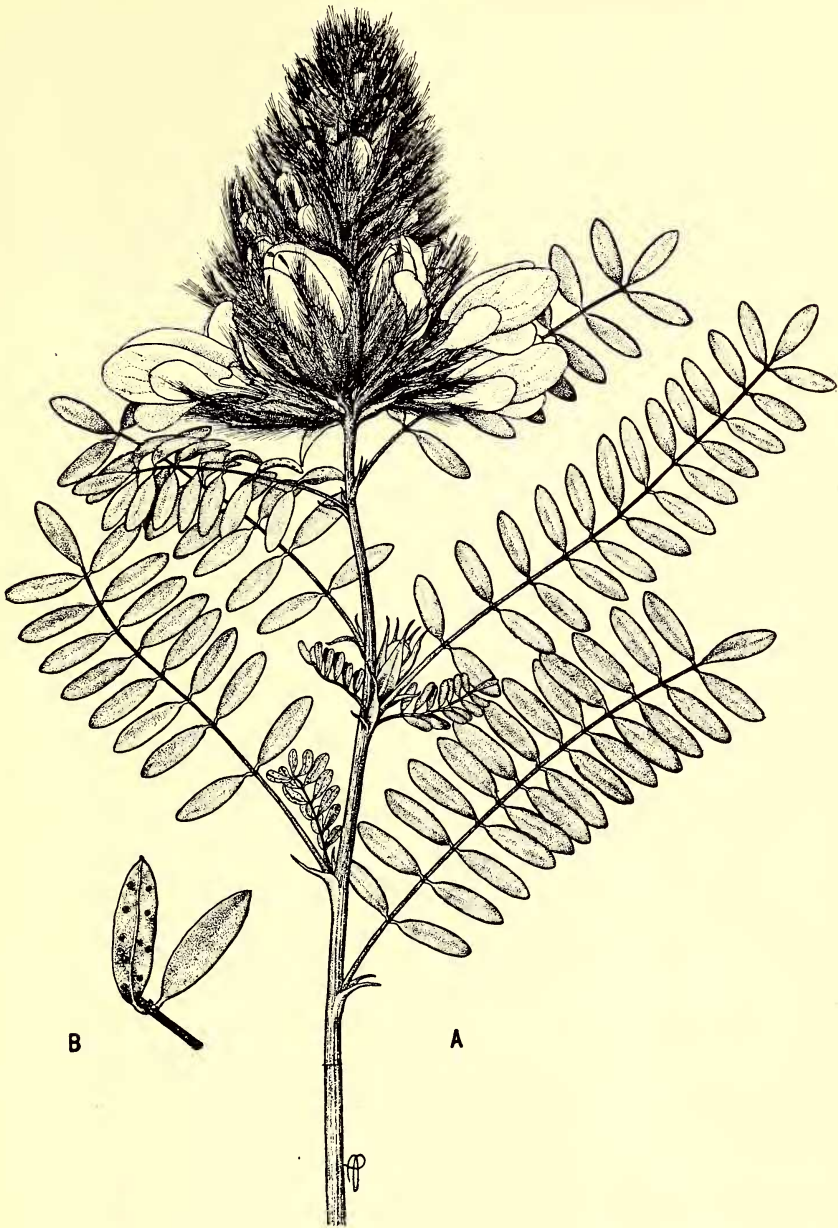


PLATE 21. DALEA WISLIZENI CALCARATA. Fig. A, flowering shoot,  $\times 5$ . Fig. B, detail of leaflets,  $\times 8$ . Drawn from type and toptype (*Gentry 7186*).

western Chihuahua, February 15, 1945, altitude 6000 feet, *Hewitt 5*. The collector reports it used as a delousing lotion for animals: 0.25 kg. to 61.0 kg. water, "yerba de piojo." This is a pubescent form with silvery sericeous leaflets; approaching *D. Wislizeni Wislizeni*.

This plant, commonly monopodial, has the virgate habit and the elliptic-acute leaflets with strong mid-veins of *D. Wislizeni Wislizeni*, but resembles *D. Wislizeni sessilis* in its twiggy branching and short-pedunculate heads. It differs from both in the glabrous branches and leaves, in the more numerous leaflets, and in the longer calyx tube with little or no dorsal notch. It is also related to the more southern *D. leucantha* and resembles it in habit, but it is separable according to the preceding key.

*DALEA WISLIZENI* subsp. *sessilis* (Gray) comb. nov. *Dalea Wislizeni* var. *sessilis* Gray, Proc. Am. Acad. 16: 105, 1880. *Parosela Wislizeni sessilis* Vail, Bull. Torrey Bot. Club 24: 15, 1897. *P. sessilis* Rydb., N. Am. Fl. 24: 104, 1920. *P. sanctae-crucis* Rydb., *ibid.*, p. 103. Plate 23.

Northern variants of *Dalea Wislizeni* were described by Rydberg (loc. cit.) as *Parosela sessilis* and *P. sanctae-crucis*. Rydberg's separation of these two entities rests primarily on whether the heads are terminal and pedunculate (*P. sanctae-crucis*), or lateral and subsessile (*P. sessilis*). Study of a series of specimens fails to demonstrate other corroborative characters. The sorting of forty-four collections on the basis of terminal and pedunculate heads versus subsessile and lateral heads, discloses twelve of the former, as being collected in the summer-fall period, and twenty-six of the latter, as having been collected in the spring. In other words, the long-pedunculate terminal heads represent the longer more vigorous shoot growth of the summer-fall growing season in response to the summer rains, whereas the lateral subsessile heads are the product of the cooler spring season. Six exceptions, fall collections with lateral subsessile heads, all show browsed or galled plants where the shoots had been damaged or chewed off. Obviously, seasonal growth response cannot support taxonomically even a form entity; I have accordingly placed *P. sanctae-crucis* Rydb. in synonymy.

*Dalea Wislizeni sessilis* is nearly confined to the oak woodland and grass associations of the northern Sierra Madre Occidental region (fig. 3). Its area is fairly distinct from those of the other subspecies, although an overlap with *D. Wislizeni calcarata* is indicated in the mountains about the Sonora-Sinaloa boundary.

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EXPLANATION OF THE FIGURES. PLATE 22

PLATE 22. *DALEA WISLIZENI CALCARATA*. Figs. C and D, upper and lower floral bracts,  $\times 16$ . Fig. E, calyx spread open,  $\times 16$ . Figs. F, G, H, banner, keel, and wing petals,  $\times 16$ . Drawn from type and topotype (*Gentry 7186*).





PLATE 22. DALEA WISLIZENI CALCARATA.

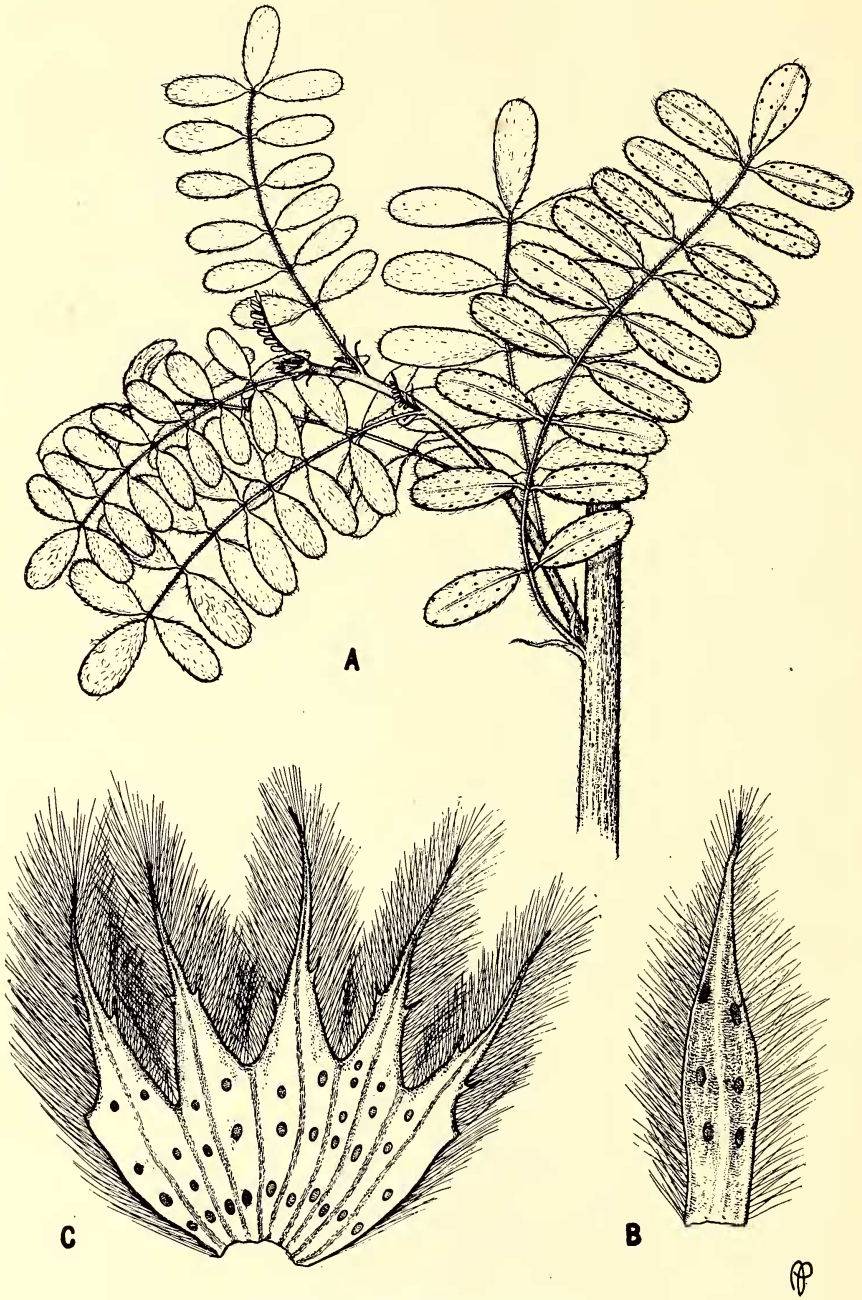


PLATE 23. DALEA WISLIZENI SESSILIS.

Ⓟ



The principal variant noted in the *D. Wislizeni sessilis* population occurs in the Chiricahua Mountains of southeastern Arizona and adjacent northeastern Sonora; it is recognized by the strong mid-vein of the leaflets, a primal character of *D. Wislizeni Wislizeni* and *D. Wislizeni calcarata*. In other respects it is like the normal of the subspecies *sessilis*. The following collections have been noted as belonging to this variant form: Piñon, northeast Sonora, January 2, 1890, *Hartman 365*; Chiricahua Mountains, September 1919, *Eggleston 10896*; Chiricahua Mountains, road from Paradise to Sawmill, October 1906, *Blumer 1477*; Chiricahua Mountains, *Blumer 48*.

Although in general the mature leaves of *D. Wislizeni sessilis* are sparsely pubescent, obovate, cuneate, and with rounded apex, the young leaves (especially the drought-depauperate ones of early spring) are commonly rather densely pubescent and they are often elliptic-acute as in the subspecies *Wislizeni* and *calcarata*. As the leaflets of subsp. *sessilis* mature, however, they develop into the elliptic-obovate, rounded-tip form. This ontogeny of leaf suggests that the elliptic-acute form is the more primitive or original and that subsp. *sessilis* is, therefore, a recent segregate of the older north Mexican subsp. *Wislizeni* population. The strong central rib form of the Chiricahua populations in *D. Wislizeni sessilis*, usually correlated with the elliptic acute leaflet, appears as a survival character in a modern evolution.

It is with considerable hesitation that I have treated these three closely related, but nevertheless coherent and distinct plant populations, as subspecies, leaving Rydberg's handy binomial system for a poorly tried modern tendency towards trinomials, quadrinomials, and worse. Just how much of classificatory burden should be placed on a system of names which has had almost 200 years of universal function because of its primal simplicity?

A forthcoming study of the Durango Grasslands makes it desirable to legitimize the following new combinations in *Dalea* since its adoption as a *nomen conservandum*.

*Dalea fulvosericca* (Rydb.) comb. nov. *Parosela fulvosericca* Rydb., N. Am. Fl. 24: 89, 1920.

*Dalea lagopina* (Rydb.) comb. nov. *Parosela lagopina* Rydb. N. Am. Fl. 24: 72, 1920.

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EXPLANATION OF THE FIGURES. PLATE 23

PLATE 23. DALEA WISLIZENI SESSILIS. Fig. A, summer shoot,  $\times 5$ . Fig. B, floral bract,  $\times 16$ . Fig. C, calyx spread open,  $\times 16$ . Drawn from *Harrison and Kearney 6227*, *Fish 18*, and ARIZ 02991.

*Dalea Lloydii* (Rydb.) comb. nov. *Parosela Lloydii* Rydb., N. Am. Fl. 24: 84, 1920.

*Dalea lucida* (Rose) comb. nov. *Parosela lucida* Rose, N. Am. Fl. 24: 74, 1920.

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### A NEW SPECIES OF POLYGONUM FROM OREGON

MORTON E. PECK AND MARION OWNBEY

*Polygonum heterosepalum* sp. nov. Herba annua parva 1.5-5 cm. alta cauli rubrotincto subglabro omnino dense folioso floridoque simpliciter vel basi ramoso ramis simplicibus inter se subaequilongis foliis late linearibus vel elliptico-lanceolatis 1-2 mm. latis 4-10 mm. longis basi haud articulatis marginibus revolutis apice mucronibus subrigidis albidis instructis ocreis conspicuis albidis profunde laciniatis laciniis subulatis rectis subrigidis floribus plerumque 2-3 in axillis foliorum fasciculatis perianthii segmentis perinaequalibus linea viridi media tribus interioribus plus minusve furfuraceis albidis usque ad 2.5 mm. longis quam duobus exterioribus plus duplo longioribus staminibus antheriferentibus tribus segmentis interioribus oppositis filamentis tribus sterilibus alternatis achenio olivaceo nitido 1.5-2 mm. longo incluso.

A small annual herb, 1.5-5 cm. tall; stem reddish, nearly glabrous, densely leafy and floriferous throughout, simple or branched from near the base, branches simple, subequal in length; leaves broadly linear or elliptic-lanceolate, 1-2 mm. broad, 4-10 mm. long, not jointed at the base, apex with a stiffish white mucro, margins revolute, ocrea conspicuous, whitish, deeply lacinate, with subulate, straight, stiffish segments; flowers usually 2-3 together in each leaf axil; perianth segments very unequal, the three inner ones somewhat scurfy, whitish with a median green line, about 2.5 mm. long, more than twice as long as the two outer